# Identification of Critical Mass Transport Processes in Solid State Sensors

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A pressure modulation technique has been developed for identification of critical mass transport processes in gas sensors. Commercially available heated exhaust gas oxygen (HEGO) sensors were subjected to periodic pressure variations of 10from 0.01 to 100 Hz. Based upon analysis of the sensor output under these transient conditions, a general expression for the sensor response as a function of frequency and sensor relaxation time was obtained. Since the relaxation times demonstrate exponential dependence (Arrhenius behavior), activation energies for the rate-limiting processes can be estimated from these times and these processes may be tentatively identified.